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Establishing Hong Kong's First Breast Milk Bank: Ensuring Safety and Quality of Donor Breast Milk

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Overview

Human breast milk has the best composition and is most suited for human babies. It contains the perfect balance of macronutrients (protein, fat and carbohydrates), micronutrients (vitamins and minerals), as well as active immune components such as antibodies, lactoferrin and white cells that protect infants from infections.[1] While Mother's own milk (MOM) is advocated, it may not be available due to medical, biological or personal reasons, and alternatives have to be sought. Although cow's or goat's milk-based formulae are convenient alternatives, the use of donor breast milk has been associated with a lower incidence of feeding intolerance and serious complications such as necrotising enterocolitis, a serious complication in newborn babies with potential significant morbidity (short gut syndrome) and mortality.[2]

A breast milk bank is a facility that collects, screens, processes and supplies donor breast milk to at-risk infants when MOM is unavailable. These banks follow stringent protocols to ensure that the donated milk is safe for consumption and of high quality. Since the first breast milk bank opened in 1909 in Vienna[3], more than 500 such facilities have been set up globally across more than 37 countries by 2024.[4] The establishment of breast milk bank in Hong Kong was expedited by the Chief Executive's policy address in 2023, highlighting it as a key initiative to enhance public health service. It aims to support infants and young children who cannot be breastfed by their biological mother, while also reducing the risk of serious illness in premature or severely-ill babies.

Establishment of the Hong Kong Breast Milk Bank (HKBMB)

Establishing a breast milk bank in Hong Kong required meticulous planning as there had been no previous experience. International standards, such as the Operational Guidelines for Milk Banks in Australia and New Zealand and those published by the National Institute for Health and Care Excellence (NICE), PATH and the Human Milk Banking Association of North America (HMBANA) were referenced[5-8] and adapted for local use. Site visits to Mainland China and overseas breast milk banks have

also proven valuable. In June 2024, the local "Guideline for Breast Milk Bank Service Operation" was issued, addressing areas such as donor recruitment, milk delivery, pasteurisation, storage, testing, as well as securing donor and recipient consents. This aligns with the principles of Baby-Friendly Hospital Initiative (BFHI), reinforcing breastfeeding as a cornerstone of infant health.

Breast Milk Safety: a Microbiological Perspective

A core focus of HKBMB is minimising risks of infectious diseases while preserving the nutritional integrity of donor breast milk. Donor breast milk can become contaminated with infectious agents intrinsically or extrinsically (Table 1). Intrinsic contamination occurs when breast milk becomes infected within the mammary system before expression, while extrinsic contamination happens during milk expression or afterwards. Intrinsic contamination of breast milk is usually secondary to maternal infection with intracellular organisms, e.g. Human Immunodeficiency Virus (HIV), Human T-lymphotropic Virus (HTLV-1 or -2), human Cytomegalovirus (CMV), or due to bacterial colonisation or infection of the mammary glands (mastitis), such as *Staphylococcus aureus* or *Streptococcus pyogenes*. In contrast, extrinsic contamination usually arises from improper hand or skin hygiene during expression, inadequately cleaned breast milk collection equipment, suboptimal storage conditions such as faulty freezers, or other sources of environmental cross-contamination. By identifying these transmission pathways, the breast milk bank can effectively manage and reduce infectious risks.

Table 1. Examples of pathogens associated with breast milk related infections

	INTRINSIC Contamination	**EXTRINSIC** Contamination
Mechanism(s) of Contamination	Agents from maternal systemic or local infections (mastitis) contaminating the milk before it is expressed	Bacteria from the skin or environment contaminating the milk during or after it is expressed
Examples of Pathogens	Maternal systemic infections: - Human Immunodeficiency virus (HIV-1 and -2) - Human T-lymphotropic Virus (HTLV-1 and -2) - Human Cytomegalovirus Pathogens associated with mastitis: - *Staphylococcus aureus*: Methicillin susceptible (MSSA) and Methicillin resistant (MRSA) - *Streptococcus pyogenes* (Gp A Streptococcus) - *Streptococcus agalactiae* (Gp B Streptococcus)	*Gram-positive organisms:* - *Staphylococcus aureus*, coagulase-negative staphylococci - *Bacillus* species (skin commensals) *Gram-negative organisms:* - *Enterobacterales*: e.g. *Escherichia coli, Klebsiella pneumoniae* etc. - Non-fermenting Gram-negative bacilli: e.g. *Pseudomonas* species, *Stenotrophomonas maltophilia*

Measures Implemented in HKBMB to Lower Infection Risks

Every step of the process in HKBMB was designed to provide safe pasteurised donor breast milk to preterm and critically ill infants in public hospitals. The journey of breast milk donation is summarised in the following diagram.[9]

1. **Donor selection**

   The safety of donor breast milk begins with rigorous donor screening. Like blood donors, potential breast milk donors are required to undergo a comprehensive health assessment, with detailed medical and lifestyle history. Additionally, blood tests are conducted to screen for infectious diseases including HIV, HTLV-1 and -2, hepatitis B and C, and syphilis.

2. **Specific requirements regarding the collection, storage and transportation of donor breast milk**

   Donors are counselled on safe milk expression and storage practices to minimise the risk of contamination at home. Education materials are provided to remind donors of hygiene measures, with specific and detailed instruction on how to collect, label and store expressed breast milk. The milk is then transported to the bank under strict temperature-controlled conditions within 10 weeks from expression. Upon arrival, the milk is checked, logged, labeled, and stored in freezers until it undergoes further processing.

3. **Milk processing and testing**

   To further reduce infectious risk, donor breast milk is subjected to pasteurisation. The Holder method, which involves heating the milk to 62.5°C for 30 minutes, is implemented. This process kills or inactivates harmful pathogens while preserving the majority of the milk's nutritional and immunological components. Donor breast milk is subjected to microbiological testing before and after pasteurisation to ensure the quality and safety of the milk. Nutritional analysis is also performed to monitor the nutritional content of post-pasteurised donor breast milk.

4. **Quality management system**

   ISO 22000 and Hazard Analysis Critical Control Point (HACCP) lay out important principles to ensure food safety. HKBMB has implemented these standards in the quality management system and targets to be accredited in the near future.

Once the milk has passed all safety checks, it is distributed to the Neonatal Intensive Care Units in public hospitals, where it is prioritised for preterm and critically ill infants upon paediatricians' prescription. Healthcare providers carefully monitor the use of donor breast milk to ensure that it meets the specific needs of each baby.

Final words

With these dedicated efforts, the Hong Kong Breast Milk Bank, located at the Hong Kong Children's Hospital, commenced operation on January 6, 2025. We envision that the establishment of the HKBMB will not only help vulnerable infants through the provision of safe donor breast milk, but also foster a stronger breastfeeding culture in Hong Kong. Many donors express a profound sense of fulfilment, knowing their contributions help save vulnerable lives. As we celebrate the launch of the HKBMB, we warmly invite all eligible mothers to join this life-changing journey, building a community of care and compassion that makes a lasting impact.

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Views expressed in this article are the author's and do not necessarily reflect the opinion or position of the BFHIHKA.

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